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The Use and Evaluation of Verbal Prompting With See to Say Problems and Answers and Safmeds to Teach Math Facts to a Student With Learning Disabilities

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(Abstract) We used a combination "SAFMEDS" and verbal see to say procedure to increase the accuracy and fluency that a single third grade student could complete math facts. The participant was labeled as learning disabled and was receiving services in reading, math, and written language when these data were gathered. The child increased his correct and decreased his error rates during teacher/student see to say math facts. A replication of baseline conditions produced a decline in correct rate during the daily reading race tracks procedure. Correct rates further increased when SAFMEDS were added to the verbal prompting and say procedures. The applicability of employing SAFMEDS and see/say drill and practice procedures in math and other basic skill areas was discussed.

Keywords: SAFMEDS; Case report; Math; ABAB Design; Correct Rate; Error Rate.

1. INTRODUCTION

Having children succeed in math and other basic skills has been correlated with success in school as well as remaining in school [1-4]. Many children with learning disabilities have difficulty in written communication [5] or math [6-7]. In addition, teachers need to employ evidence based practice when these teaching children their basic facts in math [7-16].

Precision teaching procedures [16-18] have also been shown to assist students in the acquisition of basic math facts. Such procedures as daily drill and practice [10-11], flash cards, [19-20], error drill [21] home instruction [22] , SAFMEDS (say all facts one-minute each day shuffled), [20, 22] and daily charting [18-19]. We have required a course in Precision Teaching because it has been shown to be a data-based and effective teaching procedure.
[23-24]

In the present case report, we used the "SAFMEDS" procedure [20, 22]and verbal prompting to improve the accuracy and fluency that the student could see to write math facts. Another purpose was to replicate and extend the previous findings employing SAFMEDS [20, 22]. In the present case report the effects additive effects of employing SAFMEDS were examined in a single case design.

2. Method

2.1. Participant and Setting

The participant was an eight-year-old elementary school male student.Our third grade student was labeled as learning disabled and met the state and Federal Guidelines for that disability designation. Our participant employed dot counting strategies to solve his math equations. The special education staff felt that additional practice would be beneficial. That student receive 120 minutes of instruction in the resource room for reading, math and written language.

This study took place in the resource room of a low income urban elementary school in the Pacific Northwest. The first author, an undergraduate student at a local university, worked with the participant. The primary teacher in the resource room had five years of teaching experience and had an instructional assistant. The first author worked with the child for approximately 25 minutes daily.

2.2 Pinpoints

The two pinpoints evaluated in the present study were the number of problems correct and incorrect per minute. These data were taken at the end of each session from a sheet of add facts + 2. Each sheet contained 135 problems arranged in rows of 15 problems, with single and double digit answers.

Upon the completion of each one-minute timing, the first author counted the number of problems correct and recorded these data. The first author also tallied the number of errors, give this number along with specific feedback (e. g. "great job," "you missed only one problem today," "you were really trying hard today," etc.) to the child. These data were then placed on a data form and the classroom teacher rescored the student's math work. Finally these data were displayed on the

Standard Celeration Chart [19-22].

2.3 Experimental Design and Experimental Conditions

An ABAC single case design [26] was used to analyze the effects of using verbal prompts without and then with SAFMEDS.

2.31 Baseline-1. The baseline consisted of having the participant complete the +2 math worksheet. The child was given the sheet and told to complete as many problems as he could in one minute. Baseline consisted of four one-minute timings taken for four school days.

2.32 Verbal prompts. During this phase, the student and teacher when through the first 10 problems on the +2 fact sheet. The student read the problem and answer. Next, the child had to read each of the other problems and his answers for the math sheet. Finally, the student was then required to complete the as many problems on the math sheet in a one minute time trial. This procedure was in effect for four school days.

2.33 Baseline-2. This was a return to baseline conditions. It was in effect for 5 school days.

2.34 Verbal prompts + SAFMEDS. SAFMEDS were added to the verbal see to say math facts procedures. After the teacher verbally presented the first set of problems, the child went through 12 +2 (SAFMEDS) cards two or three times. The teacher also provided feedback regarding the child's efforts. This phase was in effect for 8 school days.

2.4 Reliability of Measurement

Interobserver reliability checks were taken for each session. A correct was scored if the first author and classroom teacher scored the problem in the same manner an agreement was scored. Any deviation in scoring a word was defined as a disagreement. The percent of interobserver agreement was calculated by dividing the number of agreements by agreements plus disagreements and multiplying by 100. The overall percent of interobserver agreement was 100%.

3. Results

The average number of digits written correctly during baseline was 9.25 and 3.5 errors. When verbal modeling was employed, corrects increased (M = 22.8; range 18 to 30), while errors declined (M = .8; range 0 to 4). A replication of baseline conditions produced a decrease in corrects (M = 16.0; range 12 to 20) and small increase in error rate (M = .6; range 0 to 2). When SAFMEDS as well as verbal prompting were in effect, corrects improved (M = 29.125; range 20 to 35) while errors declined (M = .125; range 0 to 1).

A Friedman Analysis of Variance [27] found significant difference between the four conditions for corrects (χ^2 = 11.1, df = 3, p = .0112), but not for errors (χ^2 = 6.353, p = .0956, NS). Follow up tests using Wilcoxon Signed Ranks found a significant between Baseline-2 and SAFMEDS + verbal practice for corrects. (Z = -2.201; p = .028). All of the other comparisons for corrects were not significant.

4. Discusion

With the implementation of SAFMEDS + verbal prompting, there was a jump up for the number of corrects. Both interventions were effective not only in terms of a improving the frequency of correct digits written, but also in the elimination of nearly all errors. The reduction in errors produced an important change in accuracy of performance. This outcome was also noted by his classroom teacher in general education. The participant's resource room teacher was very impressed with his performance in see to write math facts during this program.

These outcomes add further strength previous research showing the positive effects of employing precision teaching procedures in math and other basic skill areas. [16, 28-29] The use of SAFMEDS further replicates the work of McDade et al. [22] and Eshleman [20] . In the present replication, only a single student was employed. Additional replications by other researchers different and more diverse students appears warranted. Future research could use younger or older students as participants.

Another aspect of this program that makes the use of SAFMEDS very attractive and practical is the fact that once they were constructed, daily sessions were easy to implement, manage, and carry out by the teacher and student. This has been also found in our other studies employing precision teaching methodology combined with such procedures reading racetrack procedures [15-16, 19, 21, 30-32]. It continues to be our opinion that SAFMEDS used in conjunction with the Direct Instruction flash card system in math [29, 34,] could offer individualized instruction for an entire classroom. Also we would urge the use of SAFMED cards with Classwide Peer Tutoring. [8] One could employ SAFMEDS rather than the lists that Greenwood et al. [8] suggest. This could be especially valuable in grades one and two when students are expected to learn and remember their basic addition and subtraction facts. At this writing we are in the process of comparing flash cards and SAFMEDS procedures in math as well as our college courses in Precision Teaching and Direct Instruction. [24] As we have urged elsewhere. [25] that providing opportunities for undergraduate as well as graduate students to carry out data-based decision-making, should allow increase the probability that such teaching procedures will be employed when our students are no longer in training. We have some preliminary evidence that this has been with case with our graduates at both the undergraduate as well as graduate levels.

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